Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1-18 (canceled)

Claim 19. (previously presented): A continuous process for manufacturing L-ascorbic acid comprising the steps of:

(a) heating an aqueous solution of a starting material comprising 2-keto-L-gulonic acid or a derivative of 2-keto-L-gulonic acid at a temperature of about 120°C to about 185°C in a reactor in the presence of at least one sulfite species under conditions such that L-ascorbic acid is generated;

(b) continuously removing from the reactor a post-reaction solution comprising unreacted starting material and L-ascorbic acid;

(c) removing at least a portion of sulfur containing compounds from the post-reaction solution;

(d) removing at least a portion of the L-ascorbic acid from the post reaction solution; and

(e) recycling unreacted starting material back to the reactor.

Claim 20. (original): The method of claim 19, wherein the sulfite species comprises SO_2, HSO_3^-, $S_2O_3^{2-}$, SO_3^{2-}, $S_2O_4^{2-}$, and $S_2O_5^{2-}$.

Claim 21. (original): The method of claim 20, wherein the sulfite species comprises sulfurous acid.

Claim 22. (original): The method of claim 19, wherein the sulfite species comprises a catalyst for the conversion of 2-keto-L-gulonic acid to L-ascorbic acid.

Claim 23. (original): The method of claim 19, wherein the sulfite is added to a final concentration comprising a range of 0.5% to 50% by moles relative to the 2-keto-L-gulonic acid compound.

Claim 24. (original): The method of claim 19, wherein the sulfite is added to a final concentration comprising a range of 1% to 20% by moles relative to the 2-keto-L-gulonic acid compound.

Claim 25. (previously presented): The method of claim 19, wherein the starting material comprises an aqueous solution from a fermentation process for producing 2-keto-L-gulonic acid.

Claim 26. (previously presented): The method of claim 19, wherein the starting material comprises an aqueous solution of 2-keto-L-gulonic acid derived from the hydrolysis of the bisacetonide of 2-keto-L-gulonic acid or the esters of 2-keto-L-gulonic acid.

Claim 27. (previously presented): The method of claim 19, wherein the starting material comprises an aqueous solution of 1 to 40 weight percent 2-keto-L-gulonic acid.

Claim 28. (previously presented): The method of claim 19, wherein the starting material comprises an aqueous solution of 5 to 30 weight percent 2-keto-L-gulonic acid.

Claim 29. (previously presented): The method of claim 19, wherein the starting material comprises an aqueous solution of 8 to 15 weight percent 2-keto-L-gulonic acid.

Claim 30. (original): The method of claim 19, wherein the conversion of 2-keto-L-gulonic acid substrate to L-ascorbic acid product preferably ranges from 5 to 95%.

Claim 31. (original): The method of claim 19, wherein the conversion of 2-keto-L-gulonic acid substrate to L-ascorbic acid product ranges from 20 to 75%.

Claim 32. (original): The method of claim 19, wherein the conversion of 2-keto-L-gulonic acid substrate to L-ascorbic acid product ranges from 30 to 60%.

Claim 33. (original): The method of claim 19, wherein the sulfur containing compounds of step (c) comprise residual sulfite and/or sulfite bound by-products.

Claim 34. (original): The method of claim 19, wherein the sulfur containing compounds of step (c) comprise sulfate.

Claim 35. (original): The method of claim 19, wherein step (c) comprises removing sulfur containing compounds by adsorption with a solid matrix.

Claim 36. (original): The method of claim 35, further comprising activated carbon as the adsorption matrix.

Claim 37. (original): The method of claim 35, further comprising ion exchange resin as the adsorption matrix.

Claim 38. (original): The method of claim 19, wherein step (d) comprises continuously separating L-ascorbic acid from unreacted 2-keto-L-gulonic acid in the post reaction solution to form an L-ascorbic acid rich solution and a solution rich in 2-keto-L-gulonic acid compound.

Claim 39. (original): The method of claim 38, further comprising the step of separating the L-ascorbic acid from the L-ascorbic acid rich solution by crystallization.

Claim 40. (original): The method of claim 38, wherein on a 2-keto-L-gulonic acid and ascorbic acid only basis, the ascorbic-acid solution of step (d) is comprised of at least 75 weight percent of L-ascorbic acid.

Claim 41. (original): The method of claim 38, wherein on a 2-keto-L-gulonic acid and ascorbic acid only basis, the ascorbic-acid solution of step (d) is comprised of at least 85 weight percent of L-ascorbic acid.

Claim 42. (original): The method of claim 38, wherein on a 2-keto-L-gulonic acid and ascorbic acid only basis, the ascorbic-acid solution of step (d) is comprised of at least 90 weight percent of L-ascorbic acid .

Claim 43. (original): The method of claim 38, wherein on a 2-keto-L-gulonic acid and ascorbic acid only basis, the 2-keto-L-gulonic rich solution of step (d) is comprised of at least 75 weight percent of 2-keto-L-gulonic acid.

Claim 44. (original): The method of claim 38, wherein on a 2-keto-L-gulonic acid and ascorbic acid only basis, the 2-keto-L-gulonic rich solution of step (d) is comprised of at least 85 weight percent of 2-keto-L-gulonic acid.

Claim 45. (original): The method of claim 38, wherein on a 2-keto-L-gulonic acid and ascorbic acid only basis, the 2-keto-L-gulonic rich solution of step (d) is comprised of at least 90 weight percent of 2-keto-L-gulonic acid .

Claim 46. (original): The method of claim 19, wherein steps (a) through (e) comprise at least a 50 mole percent yield of L-ascorbic acid.

Claim 47. (original): The method of claim 19, wherein steps (a) through (e) comprise at least a 60 mole percent yield of L-ascorbic acid.

Claim 48. (original): The method of claim 19, wherein the weight ratio of 2-keto-L-gulonic acid to L-ascorbic acid is from 0.1 to 10 in the post reaction solution.

Claim 49. (original): The method of claim 19, wherein the weight ratio of 2-keto-L-gulonic acid to L-ascorbic acid is from 0.2 to 5 in the post reaction solution.

Claim 50. (original): The method of claim 19, wherein the weight ratio of 2-keto-L-gulonic acid to L-ascorbic acid is from 1 to 3 in the post reaction solution.

Claim 51. (original): The method of claim 19, wherein step (d) comprises separation of L-ascorbic acid from unreacted 2-keto-L-gulonic acid in the post reaction solution by crystallization, chromatography, or electrodialysis.

Claim 52. (original): The method of claim 51, further comprising ion exclusion chromatography for separation of L-ascorbic acid from unreacted 2-keto-L-gulonic acid in the post reaction solution.

Claim 53. (original): The method of claim 51, further comprising simulated moving bed (SMB) chromatography for separation of L-ascorbic acid from unreacted 2-keto-L-gulonic acid in the post reaction solution.

Claim 54. (original): The method of claim 19, wherein steps (c) and (d) comprise simultaneous separation and removal of sulfur containing compounds including residual sulfite with the separation and segregation of L-ascorbic acid and unreacted 2-keto-L-gulonic acid.

Claim 55. (original): The method of claim 54, further comprising ion exclusion chromatography.

Claim 56. (original): The method of claim 54, further comprising five-zone simulated moving bed (SMB) chromatography.

Claim 57. (original): An ascorbic acid product comprising reduced coloration made by the method of claim 19.

Claim 58. (previously presented): The method of claim 19 wherein the starting material comprises 2-keto-L-gulonic acid, diacetone-2-keto-L-gulonic acid, or an ester of 2-keto-L-gulonic acid.